

King County Government Greenhouse Gas & Traditional Pollutant Emissions Inventory

EXECUTIVE SUMMARY FOR DECISION MAKERS

Year 2000

MAY, 2002

PREPARED BY: KING COUNTY DEPARTMENT OF NATURAL RESOURCES AND PARKS

Introduction

The King County Government Greenhouse Gas and Traditional Pollutant Emissions Inventory - Year 2000 (2000 Inventory) identifies sources of air emissions for which King County government is responsible*. The 2000 Inventory was initiated in January 2002 by the Department of Natural Resources and Parks under the direction of King County Executive Ron Sims, with the unanimous support of the King County Council.

In January 2002, King County Joined the International Council for Local Environmental Initiatives (ICLEI) "Cities for Climate Protection" campaign via County Council Motion 11364. In recognition of the important role local governments play in responding to climate change, ICLEI has partnered with over 500 cities and counties worldwide. More than 100 participants in the United States, include New York, Los Angeles, Miami-Dade County and Chicago. Closer to home, an active Northwest contingent includes Seattle, Portland, Multnomah County, Tacoma, Spokane, Olympia and Burien. The first step in the Cities for Climate Protection campaign, as outlined by ICLEI, is to complete an emissions inventory.

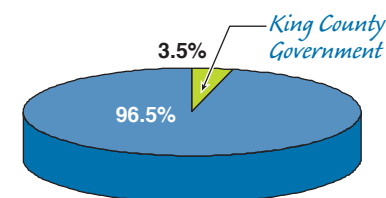
This *Executive Summary* includes background on climate change and air pollution, a description of methodology, and a summary of the findings. The 2000 Inventory focuses on internal activities and is intended to inform decision makers within King County government.

How do Local Governments Affect Climate and Air Quality?

Local governments build roads, manage transportation systems, handle solid waste and treat wastewater – all of which have the potential to produce traditional pollutants and greenhouse gases. By addressing their own emissions, local governments "walk the talk" and offer credible leadership that influences the behavior of citizens. Just as important, local governments have tremendous opportunities to reduce emissions for an entire region. The figures at right, for example, show King County Government's relative contribution to community-wide emissions; however King County's influence extends far beyond the 3.5% of greenhouse gases and 2% of traditional pollutants that are attributed to internal activities. As a local government, the County offers transportation alternatives, forest management (trees *absorb* greenhouse gases), recycling programs, land use planning, and countless other services that can work to reduce emissions *across* operational and jurisdictional boundaries. In short, cities and counties are both a source of emissions and an opportunity to protect human health and limit climate risks.

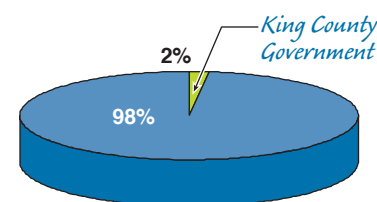
* Traditional pollutants can harm human health and create smog; greenhouse gases contribute to climate change or "global warming".

KING COUNTY GOVERNMENT RELATIVE CONTRIBUTION OF GREENHOUSE GASES TO COMMUNITY-WIDE EMISSIONS












- King County Government Emissions (3.5%)
- King County Community-wide Emissions (source: PSCAA 1999 Inventory) (96.5%)

KING COUNTY GOVERNMENT RELATIVE CONTRIBUTION OF TRADITIONAL POLLUTANTS TO COMMUNITY-WIDE EMISSIONS



- King County Government average % of NOx, VOC, PM, SOx emissions (2%)
- King County Community-wide Emissions (NOx, VOC, PM, SOx; averaged) (98%)



Greenhouse Gases (MTCE) ^a			Traditional Pollutants (tons)					
DIRECT EMISSIONS		Municipal Solid Waste ^b		NOx	VOC	PM	SOx	
		Cedar Hills Landfill	88,821	83.4	4.7	0.0	16.4	
		Closed Landfills	13,371	1.2	0.0	0.0	0.2	
	Mobile Sources							
		Metro Buses	26,310	802.1	55.0	31.0	20.4	
		County Fleet - (gas and diesel)	7,560	107.4	49.7	3.3	4.0	
		Lawn and Garden	included in misc. fuel	0.7	262.1	2.5	0.0	
		Miscellaneous Fuel Use	625	13.3	6.2	0.4	0.5	
		Employee auto use for County Business	236	2.5	3.3	0.1	0.2	
	Municipal Wastewater Treatment							
		South Treatment Plant (Renton) ^c	3,624	0.9	43.9	4.1	0.1	
		Westpoint Treatment Plant	7,885	115.1	10.0	1.2	4.8	
		Vashon Treatment Plant	52	0.0	0.5	0.0	0.0	
		Biosolids ^d	872	0.0	0.0	0.0	0.0	
	Area Sources (Evaporative Emissions)							
		Paint (Interior/Exterior)	0	0.0	48.1	0.0	0.0	
		Traffic Paint	0	0.0	33.9	0.0	0.0	
Cleaners		0	0.0	11.9	0.0	0.0		
Auto Products and Misc. Solvents		0	0.0	2.0	0.0	0.0		
Road Paving/Repair materials		0	0.0	20.1	0.0	0.0		
Pesticides		0	0.0	0.3	0.0	0.0		
On-site Energy ^e								
	Propane	179	0.9	0.0	0.0	0.0		
	Natural Gas	3,579	11.4	0.7	0.9	0.1		
TOTAL - DIRECT EMISSIONS			153,111	1139.0	552.2	43.5	46.7	
INDIRECT EMISSIONS	Energy Purchases							
		Electricity (Seattle City Light)	1,753	33.3	0.3	1.6	36.2	
		Electricity (Puget Sound Energy)	10,685	74.1	1.7	5.7	93.8	
		Steam (Seattle Steam)	945	3.0	0.2	0.2	0.0	
	TOTAL - ENERGY PURCHASES			13,383	110.4	2.2	7.5	130.0
	Mobile Sources							
		Employee Commute	6,164	105.1	105.2	2.6	5.6	
		Lawn and Garden	n/a	0.4	14.0	0.1	0.0	
		Heavy Equipment	396	16.9	1.5	0.6	0.4	
	Municipal Solid Waste							
		Employee Office Waste ^f	153	0.2	0.0	0.0	0.0	
		Area Sources						
		Road Paving/Repair materials	0	0.0	117.4	0.0	0.0	
Pesticides		0	0.0	0.1	0.0	0.0		
Cleaners		0	0.0	3.4	0.0	0.0		
Paint		0	included in direct sources, listed above					
TOTAL - OTHER INDIRECT EMISSIONS			6,713	122.6	241.5	3.3	6.1	

a. Metric Tons Carbon Equivalent is a common unit for expressing values of greenhouse gases. For reference to other emissions inventories, 1 MTCE is equivalent to 3.66 Metric Tons Carbon Dioxide Equivalent.

b. There are two different methods for calculating greenhouse gas emissions from landfills. The value reported in the table includes carbon dioxide and methane, whereas some methods only consider methane emissions. For this latter method the total greenhouse gas emissions from Cedar Hills and closed landfills are 31,570 and 11,545 respectively.

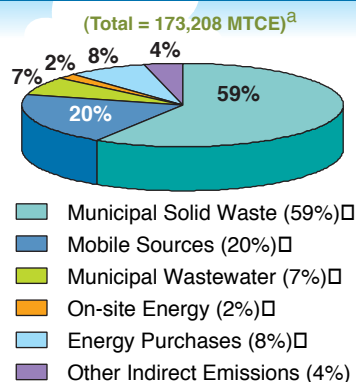
c. The South Plant does not burn digester gas on-site, rather it "scrubs" the waste gas and sells it to Puget Sound Energy. Conversely, the Westpoint Treatment Plant burns waste gas in an on-site co-generation unit for its energy needs. Therefore, the estimated direct greenhouse gas and NOx emissions appear much smaller for the South Plant, however, it should be noted that "downstream" emissions do occur from Puget Sound Energy's use of this gas for electricity generation. Please see the 2000 Inventory — Full Report for more information on this subject and to learn more about energy use at these facilities.

d. Expressed value does not include the potential of biosolids to contribute to sequestration of carbon dioxide (a greenhouse gas). A preliminary and conservative estimate by King County Inventory staff for the marginal sequestration benefit of biosolids application on forestlands is roughly 6000 MTCE. As of May 2002, a study at the University of Washington is in progress to determine the actual emission reduction benefit.

e. These energy sources produce on-site emissions (direct) whereas the energy purchases through Puget Sound Energy, Seattle City Light and Seattle Steam produce indirect emissions. For emissions by electricity source (coal, natural gas, etc) please see the 2000 Inventory — Full Report.

f. The estimate considers waste for the King Street Center and Transit Division, only. Please see the 2000 Inventory — Full Report for more information about how emissions are avoided through work-site recycling and reduction efforts. For example, for King St. Center and Transit Division alone, it is calculated that approximately 1074 metric tons carbon equivalent were avoided in 2000 for the life-cycle of the recycled product.

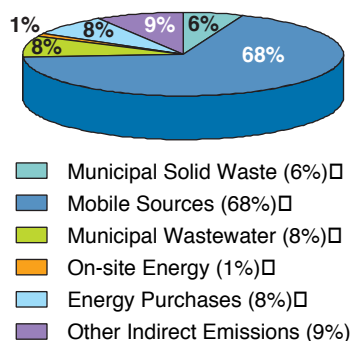
Greenhouse Gas Emissions



Traditional Pollutant Emissions

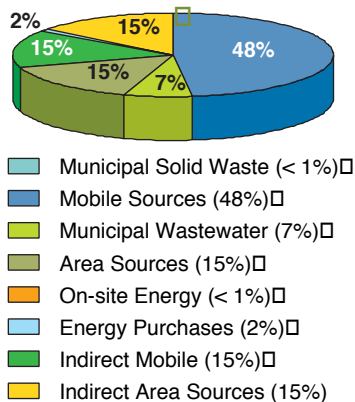
NITROGEN OXIDE (NO_x) EMISSIONS

(Total = 1,372 U.S. tons)



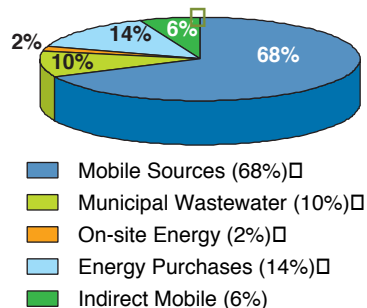
VOLATILE ORGANIC COMPOUNDS (VOC) EMISSIONS

(Total = 796 U.S. tons)



PARTICULATE MATTER (PM₁₀) EMISSIONS

(Total = 54 U.S. tons)



Explanation of Findings

HIGHLIGHTS

- King County's major regional services – Metro Buses, Municipal Solid Waste landfills, and the Municipal Wastewater Treatment plants – constitute the largest portion of greenhouse gases in the *2000 Inventory*.
- Mobile Sources (Metro Buses, county fleet, lawn and garden, etc) are the County's largest source of traditional pollutants.
- Approximately 10% of all greenhouse gas emissions for King County come from energy purchases and on-site propane and natural gas burning. Nationally, energy use accounts for roughly 1/3 of greenhouse gas emissions.
- Please see the *2000 Inventory – Full Report* for more findings.

CONTEXT

It is important to note that one ton of any particular greenhouse gas or traditional pollutant is not equal to one ton of a different pollutant or gas. Each pollutant has a unique ability to either affect human health or contribute to smog, whereas each greenhouse gas differs in its ability to affect the climate.

The *2000 Inventory* does not include every direct and indirect source of emissions, nor does it quantify the benefits of many emission reduction efforts that the County has already made. Rather, the *Inventory* is a “snapshot” for calendar year 2000, which captures all of the major direct sources of emissions and some notable indirect emissions. It is intended to provide general insight into the types of County activities that produce emissions with sufficient detail to establish the needed baseline. Some examples of note-worthy efficiencies planned or taken in recent years, such as cleaner fuels in Metro buses, an energy project at the regional landfill, and new hybrid fleet vehicles, are included in the accompanying *2000 Inventory - Full Report* and *Technical Appendix*.

Why do an Emissions Inventory?

The *2000 Inventory* establishes a baseline from which to help set priorities and measure King County's success over time. More than 30 state governments, 100 other local governments, and several major corporations located in the U.S. - LaFarge, BP-Amoco, Ford, Boeing, and Shell to name a few - have voluntarily inventoried their greenhouse gas emissions in order to:

- save money by highlighting opportunities to increase efficiency
- prepare for potential future regulations
- participate in emission trading programs
- identify “co-benefit opportunities” (e.g., reducing regulated pollutants that form smog and harm human health while reducing greenhouse gases)
- demonstrate environmental leadership and social responsibility

Though usually done to meet federal Clean Air Act standards, traditional (regulated) pollutant inventories provide many of the same benefits listed here for greenhouse gas inventories. Currently, the Puget Sound Region is in compliance with all Clean Air Act standards; traditional pollutants continue to be a concern, however, even when federal standards are being met because of their potential to harm human health and reduce visibility. Further, many sources of emissions produce both greenhouse gases and traditional pollutants. Therefore, the *2000 Inventory* examines traditional pollutants and greenhouse gases simultaneously in order to assure that emission reduction strategies are as comprehensive as possible in benefiting both community health and reducing climate risk.

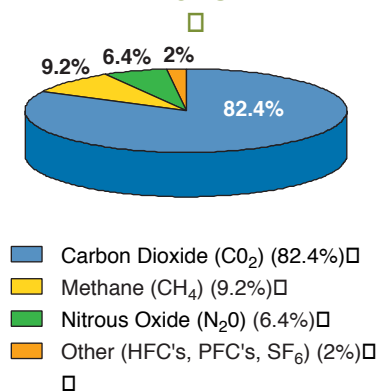
Methodology: What is Included in King County's 2000 Inventory?

GASES AND POLLUTANTS

The 2000 Inventory includes:

- ④ **The three most abundant greenhouse gases:** carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O) make up about 98% of all greenhouse gases emitted in the U.S. These “heat-trapping” greenhouse gases cause climate change, but are not directly harmful to human health (humans breathe carbon dioxide every day). Their concentrations in the atmosphere are greatly increasing as a result of human industrial activities and deforestation.
- ④ **Four traditional pollutants of concern** that can, at high concentrations, contribute to smog and pose a threat to human health: nitrogen oxides (NO_x), volatile organic compounds (VOCs), particulate matter (PM) and sulfur oxides (SO_x). PM and VOCs constitute the bulk of toxic air emissions, a significant concern in the Puget Sound region.

US GREENHOUSE EMISSIONS BY GAS*



* The percentages reflected here consider the differing abilities of each gas to trap heat - called "global warming potential".

Source: EPA Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-1999.

THE BOUNDARIES

The first logical step in protecting climate and reducing air pollution is to examine those activities for which the County is responsible - operations, maintenance, and to the extent possible, purchases and contracts. This “corporate” model enables King County to focus on those emissions over which it has the greatest influence. General emission categories included in the 2000 Inventory:

- ④ **Direct Emissions** from sources that are owned or controlled by King County, e.g. municipal solid waste landfills, mobile sources such as Metro buses, and wastewater treatment plants.
- ④ **Energy Purchases** that are the consequence of King County activities, though the emission sources are not on-site. Emissions occur from processes inherent in the generation and transmission of energy, owned by the utility.
- ④ **Other Indirect Emissions** or “upstream” emissions. Like energy purchases, these emissions are the consequence of particular County actions, purchases, or policy, though the emission sources are not owned by King County. Examples include mobile sources from contracted work and employee commutes.

Next Steps

REDUCTION TARGET AND ACTION PLAN

The next step is to develop strategies to reduce emissions and identify where the County has already made progress, as directed by the King County Executive and County Council (*Executive Policy and Procedure, PHL 10-1-1 (AEO)*).

The Department of Natural Resources and Parks (DNRP) will facilitate a process with the affected departments to set an emission reduction target for King County government by October 1, 2002. The reduction targets will be accompanied

by an Action Plan that begins to identify how King County will achieve the targets. In many cases, the County's internal programs are already reducing emissions; the Action Plan will build upon the success of these ongoing efforts and explore new programs to help meet emission reduction targets. The Action Plan will also look into carbon sequestration by trees and will investigate emission trading options.

COMMUNITY-WIDE EFFORTS

DNRP is also directed to identify potential roles for the County in reducing community-wide emissions. Addressing emissions for the community at large requires partnership with regional leaders, namely the Puget Sound Clean Air Agency and the City of Seattle, as well as outreach to other local governments, schools, citizens, and businesses.

Check out these Resources QUESTIONS?

For questions about the 2000 Inventory or for general information on air quality or climate change contact **Don Theiler**, Manager, Department of Natural Resources and Parks, Wastewater Treatment Division, (206) 684-1551.

FOR MORE INFORMATION

Please see the 2000 Inventory - Full Report and Technical Appendix.

HELPFUL LINKS

<http://www.ipcc.ch/>

<http://tao.atmos.washington.edu/PNWimpacts/Infogate.htm>

<http://www.usgcrp.gov/usgcrp/default.htm>

<http://www.pscleanair.org/>

http://www.cityofseattle.net/environment/clean_air.htm

<http://www.epa.gov/globalwarming/index.html>